show that its velocity is variable. It is *approaching* the solar system now (September 12) with a velocity of 8 kilometres per second. This will increase in two days to 14 kilometres, and in the next two days will decrease to its former value of 8 kilometres. This cycle of changes is repeated every *four* days. . . . The orbit is nearly circular, and is comparable in size with the moon's orbit round the earth.

"This centre of gravity, and therefore the binary system, is approaching the solar system at present with a velocity of 11·5 kilometres per second. A few measures of the velocity of Polaris made here (Lick) in 1896 gave its velocity of approach at the rate of 20 kilometres per second. Part of this change since 1896 could be due to a change in position of the orbit of the binary system, but most of it must have been produced by the attraction of a *third* body on the two bodies comprising the '*four-day*' system."

A CORRESPONDENT to the *Scientific American* (September 16) says that Mr. J. A. Brashear has just completed one of the pair of large astronomical camera doublets for the Observatory of the University of Heidelberg. They are next to the largest so far made, being 16 inches clear aperture and 80 inches focal length. Two of these doublets, each consisting of four lenses, are to be made, and are to be used almost exclusively for the photographic discovery of new asteroids. The reason for using two cameras is to provide a check on the possible inaccuracies inseparable from the use of photographic plates, such as false images, &c. The track of an asteroid with a lens of this focus on an 8 × 10 plate is only about one-twentieth of an inch long for an exposure of three hours. As the curves of the lenses have necessarily to be very deep, the casting of the great discs was found to be very troublesome. The fund for the equipment has been provided by Miss Catherine Bruce, of New York City, who was also the donor of the largest photographic doublet (24-inch aperture), to the Harvard College Observatory at Arequipa.

WE learn from the *Evening Standard* that the expedition sent by the Vienna Academy of Science to India to observe the shower of meteoric Leonids during the night of November 14–15, or the following night, has started from Trieste. The leader of the expedition is Herr Director Weiss, of the Vienna Observatory, who is accompanied by Prof. von Hepperger, of the Gratz University, the astronomers, Dr. Hillebrand, Dr. Prey, Herr Rheder, and Dr. Mache. The Indian Government has promised to give the expedition, which will make its observations near Delhi, every possible assistance.

THE FREEDOM OF THE CITY OF MANCHESTER.

ON Friday, October 6, the City of Manchester conferred her freedom on Enrigueta Augustina Rylands, Robert Dukinfield Darbishire, and Richard Copley Christie.

MRS. RYLANDS.

Mrs. Rylands presented to the city the library, magnificent in its contents and beautiful in its fabric, which she built in memory of her husband, John Rylands, whose name it bears—John Rylands, who as "a Manchester merchant built up from the lowliest beginnings a business of unparalleled magnitude, and left behind him a name for industry that never hasted nor rested, and a probity that knew no shame."

Principal Fairbairn, in his inaugural address, drew a remarkable parallel between Alexandria, whose library was the richest in the world, and Manchester, "cities, whose princes were merchants and whose merchants princes," and, he added, "everything that raises a great provincial and industrial city to metropolitan rank makes for higher order, sweeter life and purer manners." The opening of this great library calls for national jubilation.

The noble fabric, designed by Mr. Basil Champneys, is in the fourteenth century Gothic style, and is possibly the finest building erected in England in this generation. The building is built entirely of Penrith limestone, the exterior being the dark red Barbary stone, and the interior delicately shaded Shawk stone.

The staircase which leads to the main library is surmounted with a beautiful octagonal lantern surrounded by a carved stone gallery. The library proper is set back ten feet from the line of the building in order to secure a sufficient supply of light, and is built on the collegiate plan in a long aisle ending in an apse, the total length being 148 feet.

The building is vaulted and groined throughout in stone, it is divided into eight bays occupied by bookcases, and contains a gallery in which this arrangement is repeated; two large rooms opening from the apse contain the collection of Bibles, and the maps. The whole building is elaborately finished with statues and carving, and the fittings are all in harmony with the general scheme of decoration.

Two beautiful traceried windows, by Mr. Charles Kempe, form a notable addition to the beauties of the building. The library contains the famous Althorp collection, and Mrs. Rylands' private collection, which contains Wycliffe MSS. and Wynkyn de Wordes; the library has been endowed, and will be kept up to date.

MR. R. D. DARBISHIRE AND MR. R. C. CHRISTIE.

When Sir Joseph Whitworth lay on his deathbed he attempted to complete a scheme for the utilisation of his property.

But he could not explain so vast an idea, and, throwing out his hands, exclaimed "I cannot do it now; I must leave it to you, who know what it means!"

And it was to Lady Whitworth, to Mr. Christie and to Mr. Darbishire that he left his great wealth.

Lady Whitworth has followed her husband; Manchester has created the two remaining co-legatees her honorary citizens in recognition of the admirable way they have carried out their trust.

In connection with this trust, the legatees presented the site of the Manchester Technical School, and contributed largely to the School of Art; made many valuable gifts of money to the Owens College for the engineering laboratory, the museum, the college hospital property, and for general purposes; and presented ten acres of valuable land as an athletic ground for the College; finally presented the Whitworth Hall, now in course of erection at a cost of 50,000*l*. Presented and partially endowed the Whitworth Park and Art Gallery; erected a public library and hall at Openshaw (where Sir J. Whitworth and Co.'s works are situated).

In addition to the great personal labours in the wise and generous application of the Whitworth estate, Mr. Christie rendered invaluable service to the College in the times of storm and stress. Mr. Christie occupied in 1854–5 the united Chairs of History, Political Economy, Law and Jurisprudence. He is president of many learned societies, and chairman of numerous public bodies, charities and trusts; he is president of the Cancer Home and Pavilion, an admirable institution which originated in his generosity.

His chief literary production is the masterly biography of Etienne Dolet, the second edition of which has just been published.

The magnificent new library at the Owens College which bears his name was his personal gift, and was erected at a cost of 21,000*l*.

The total sum which passed through the hands of the Whitworth Trustees was 1,250,000*l*.; of that sum, 250,000*l*. was spent in redeeming promises and obligations, and the legatees themselves are responsible for the distribution of 960,000*l*.

W. T. L.

VISIT OF THE INSTITUTION OF ELECTRICAL ENGINEERS TO SWITZERLAND, AUGUST 31 TO SEPTEMBER 8.

CONSERVATIVE principles are no doubt of considerable service to England, but perhaps least so when applied to the problems of industry. It is a curious and possibly significant fact that as an electrical power England occupies a very insignificant position, and this in spite of the circumstance that the foundations of the industry were to a great extent laid by English engineers. Some years ago a very authoritative statement was made that in so far as ships of war are concerned our best policy is to watch the experiments of foreign nations and to profit by them, rather than make experiments for ourselves; and it is not uncommon to hear similar remarks with regard to the industrial use of electrical appliances. Unhappily we seem to have forgotten the immense advantages which have accrued to us from our pioneering of the railway industry. No doubt in the early days many mistakes were made and much

money was spent in railway experimenting, which foreign countries were afterwards saved; but meanwhile the railway industry had become established in England, and other countries were for many years practically compelled to purchase their railway equipments in England. It seems to the writer of this article that the position formerly occupied by England in railway matters has been taken by America in respect of electric traction, and by Switzerland in regard to the industry of the distribution of electric power. We now certainly profit by American pioneering in electric lighting and tramway work—but we do not get their experience for nothing, for meanwhile their manufacturing industries have become established, and America takes tithe of us when we become her customers. In Switzerland the absence of coal and the presence of an industrious and highly educated population has no doubt co-operated to bring about the wonderful progress which has been made in developing water powers electrically, and in establishing the corresponding industry of the manufacture of electrical appliances. It was on all accounts a happy inspiration for the Institution of Electrical Engineers to visit Switzerland, and for its members to become personally acquainted with the great electrical works of that country; it is only to be regretted that the remainder of the British public did not accompany the members.

Of course we had long understood that the Swiss had done great things electrically, but a visit was necessary to enable us to form an adequate idea of the industrial revolution which has been effected, and whose importance it is impossible to over-estimate. It is also impossible to overestimate the kindly hospitality which was extended to the Institution by the great Swiss manufacturing firms, and indeed by the whole electrical fraternity of Switzerland. We were received everywhere with open arms, works were not only thrown open to our inspection, but every effort was made to explain everything that required explanation, and we were made to feel that not only were we guests, but welcome guests. The following brief account is not intended to be a technical description of our visit, for which the electrical journals may be consulted (an excellent account has already appeared in *Engineering*), but is rather in the nature of a record of the writer's general impressions.

September 1.—About half the party arrived at Bâle in the morning and spent the afternoon in a visit to the Alioth works at Münchenstein. There is a great similarity between these works and those of Brown, Boveri and Co. at Baden; both are new, both are clean, both are worked for the most part by polyphase motors, both of them make excellently designed machinery, mostly of the alternate current three-phase type, and both of them seemed to have as much work on hand as they could carry out. Though a minor matter, the design of the brush holders for continuous current dynamos at Münchenstein met with some attention; they were very neatly made of aluminium on correct dynamical principles.

September 2.—The rest of the party having arrived we went to see the great Power Station at Rheinfelden on the right hand bank of the Rhine. This station has a capacity of twenty turbines of 840 horse power each, the power being supplied by the water of the Rhine with a fall of from three to five metres. To meet variations in the level of the river, the turbines are constructed in a rather peculiar manner, and in fact consist of two turbines on one shaft. The turbine shafts are supported on an oil film, pumped in below a flange; the same high pressure oil being also employed to work the differential governing gear, which it appeared to do very well indeed. However, the load on the dynamos at Rheinfelden is pretty steady, but we found at some other stations that regulation was performed by hand, especially when the power was used for railway or tramway purposes. Some of the power is used for lighting and motors in the villages round about Rheinfelden, and up to a considerable distance away, the three-phase system being employed at a line pressure of 6800 volts. The bulk of the power, however, is used for chemical works on the spot, viz., aluminium, soda and bleach, and carbide, but we were not allowed to see any of these works The power is a good deal cheaper than at Niagara, and the whole installation gave one the idea that it had "come to stay," the hydraulic works being very solid and the power house roomy and convenient and well kept, though no doubt it had suffered an extra clean up.

The party was entertained at lunch by the directors of the Rheinfelden works; and Herr Rathenau came from Berlin to welcome us, and give us an invitation to visit Berlin next year, an invitation which it is to be hoped the Institution will accept; in any case, Herr Rathenau deserves our best thanks.

In the afternoon we went on by train to the works of Brown, Boveri and Co. at Baden (Switzerland). The works are fairly large, 1300 men and a staff of 170 being employed, and are as much as possible under one roof. Here we saw much the same kind of work that we had seen at the Alioth works, but on a much larger scale. The most interesting exhibit was undoubtedly Mr. C. E. L. Brown himself, who took great pains to ensure our seeing as much as possible in the time at our disposal. The bulk of the work appears to be the construction of three-phase generators and motors of the ordinary type. The large generators were mounted very conveniently with the fixed portion (armature) on trunnions so that it could be turned round for the convenient execution of repairs. The tools were very modern, but there was not nearly so much repeat work being done as the writer at least had expected: nor was there any show of automatic machines. In fact the works were more like an English than an American works, though on a larger scale and newer than any similar works in England.

September 4.—The party being now at Zürich, expeditions were made to the Zürich central station, the works of the Oerlikon Company, the gas engine power house of the Zürich-Oerlikon-Seebach tramway, and the works of Messrs. Escher, Wyss and Co.

The Central Power Station.—The whole of the water of the river Limmat, which drains the Lake of Zürich, is, or can be, turned through the turbines of the power station, the general construction being very similar to that at Rheinfelden. A good deal of the power is used for pumping water, the excess water being used in high pressure turbines for electric generation.

The Oerlikon works are very like the works at Baden, but are much older, and the generators on the three-phase principle appeared to be chiefly of the inductor type. The design of the three-phase motors appears to depend very much on the size, the small ones having simple short circuited squirrel-cage rotors, while the larger ones have a regular winding, coupled up star fashion, and arranged for the introduction or removal of resistance by pulling or pressing a rod passing up the rotor shaft. We saw a nearly-finished locomotive for the Jungfrau railway, the motors being three-phase and provided with enormous rheostats for varying the speed and absorbing power when the cars run down hill. Who would have thought twenty years ago that the Arago disc contained such potentialities? The steel castings in this works were good throughout.

The works of Escher, Wyss and Co. do not demand any special note in so far as arrangement, &c., is concerned; but the firm seems thoroughly to understand the art of turbine making, as it should do, seeing that most of the turbines in the country appear to have been made at their works. Special pains were taken here to show us everything that was to be seen, and we had an unrivalled opportunity of inspecting the details of turbine construction.

Dowson Gas Central Station of the Zürich Oerlikon Street Railway at Oerlikon.—It was rather a surprise to us to find the street railway driven by Dowson Gas in a land reputed to be covered with water powers. The writer must admit to feeling a certain amount of satisfaction at the idea that the water powers were getting exhausted in the neighbourhood of Zürich before British Industry had become a thing of the past. The truth is that there will be no more cheap power for Zürich until some one or other of the numerous schemes for converting valleys into lakes is actually accomplished and very likely not even then. With regard to the Dowson plant itself, there was nothing very striking about it. The engines were not particularly large, but they appeared well made and particularly well water-jacketed. Little or no information could be obtained of interest to Gas Engine people; but economy of coal must be a great consideration when it costs 32 francs per 1000 kilos.

At the Selnau Transformer Station we had an opportunity of seeing how high-tension three-phase currents are used for transmitting power to a sub-station at which continuous current at 500 volts is generated for driving tramway motors. One of the most interesting things about this sub-station was the switches used for turning on the three-phase current, and so starting the continuous current generators to which the three-phase motors are directly coupled. As is, of course, well known, it is in general necessary that resistance should be inserted in the rotor circuit of a three-phase motor in order to enable it to start under any sort of a load. At the Selnau sub-station the switch

board was placed above a kind of stone cellar into which the high pressure leads were conducted, the pressure being 2000 volts. By moving the levers on the switch board the current could be switched on and resistance gradually removed from the star winding in the rotor circuits, so that by the time these had attained their proper speed, all the additional resistance had been cut out. We saw the operation of starting successfully performed.

A number of diagrams had been prepared to illustrate to us the essential characteristics of the apparatus. One of these curves seemed to show that the efficiency of the three-phase motors remained within a very small percentage of the same value, the load increasing from 40 per cent. to its full value, a fact which seems to illustrate the great advantage which may be and is obtained by using these motors on variable loads.

Visit to Schaffhausen and Neuhausen.—One is, of course, always pleased to see Schaffhausen on its own account, but there did not seem any particular electrical reason for visiting it. There is the usual central station, power being taken from the Rhine with a fall of from 4 to 5 metres. A little higher up the river there is another similar but older station, the tail race of which is built under the head race of the lower station. One of the turbines was governed by a device which looked about as simple as the machinery employed in cotton spinning, but it seemed to act all the same, though not better than the simpler devices employed by Escher, Wyss and Co. Some of the electric power is used for driving the machinery of a worsted spinning mill and twine works which were visited by several members of the party. Some of the water of the Rhine is deflected, one might almost say stolen, from above the falls at Neuhausen to work a plant most artistically situated just opposite the castle. There is no question but that the appearance of the falls has suffered by the water so deflected, and it is understood that local vested interest in the appearance of the falls is likely to prove too strong for those who desire to utilise their power.

Part of the afternoon was spent in a visit to the works of Messrs. Sulzer Bros. at Winterthur, so well known to engineers as the birthplace of economical engines. We saw several of the engines whose economic performances have secured the admiration of the engineering world. They are of the compound, tandem type, with modified Corliss valve gear, both cylinders being steam jacketed, and heavily lagged with a non-conducting compound. Outside all is a coating of planished steel, which gives the engine a remarkably fine appearance. It appears that there is some evidence that these engines have on occasion developed one I.H.P. on as little as six kilos of steam.

On Wednesday, September 6, a meeting of the Institution of Electrical Engineers was held in the great hall of the Polytechnikum, to hear a paper by Prof. Amsler on the water power at Schaffhausen. Dr. Amsler was not present himself, his paper being read by the secretary, and afterwards discussed indiscriminately by the English and Swiss engineers present. It is not to be inferred from this that they necessarily understood one another; in fact, the writer was rather surprised to find that the linguistic powers of Swiss engineers do not appear to be appreciably greater than those of their English *confrères*.

It is usual to see the Polytechnikum of Zürich held up for our admiration as representing all that is best in technical education. If magnificence of building, opulence in apparatus and luxury of appointment constitutes a successful Polytechnik, then there is no doubt that quite apart from its staff the Zurich institution deserves the position which it apparently commands. The writer cannot help saying that he did not see a single piece of apparatus which he had not seen thousands of times before, that nearly all the apparatus in the Physical Laboratory appeared to him to be clumsy and old-fashioned in design, and that he saw no evidence of anything except an immense amount of what may perhaps be suitably described as second-class teaching of the "fife and drum" order. With regard to the Chemical Laboratory, the appliances were magnificent; but there again, so far as the actual laboratories were concerned, there was not very much of interest, or if there was we did not see it. The basement of the chemical building was taken up by the most magnificent appliances for drawing in fresh air, either through a stream of water in summer time, or over a heated surface in winter, the whole of the air supply of the building being treated in this manner. So far as the writer could judge, the electro technic department appeared to be the most interesting part of the Polytechnikum, and there was no lack of machinery of all kinds of the latest type. It is understood that the Swiss electrical manufactories make great use of the facilities for testing afforded by the electro technic department of the Polytechnikum. It is fair to add that we were rather hurried in our visit; neither the writer nor any one else saw the whole of the departments; and it was the middle of vacation time, when the busiest chemical laboratory looks like a desert.

Thursday, September 7, was practically occupied by a cheap trip to Engelberg, except that it was not particularly cheap. The greater number of the members visited the Stansstad-Engelberg Railway, and for the first time the majority were able to see how a railway may be driven by means of three-phase motors. The starting and stopping of these machines apparently goes on in the smoothest way, and when the cars are running downhill the motors work as generators and pump power back to the generating station, where it is absorbed by resistances. A still better illustration of traction on the three-phase system was afforded by the visit on the last day of the meeting to the Kander power station, near Spiess, and then to the Burgdorf-Thun Railway. In fact, there was a tolerable consensus of opinion that this was the most important day of the tour. The Kander station is not large, but is equipped in the most modern manner by Brown, Boveri and Co. The water of the Kander at Spiezwyler, with an effective head of about 69 metres, is carried in an iron pipe down to the turbine house, where it operates turbines of about 900 horse-power working upon three-phase alternate current generators working at 4000 volts "composed" pressure and 40 cycles per second. This current is partially used for distribution in the neighbourhood; it is partly raised to 16,000 volts, and transmitted to Berne, Burgdorf and Munsingen, where it is re-transformed and used for general purposes. In addition to this, a large part of the power is transmitted at 16,000 volts, and distributed by means of transformer stations along the course of the Burgdorf-Thun Railway at a pressure of 750 volts. Now an electric railway, as everybody knows, takes its power in a very irregular manner, so that the engineers of the Kander station have had to face the difficulty of regulating a load part of which is practically constant and part of which is exceedingly variable. Some, if not all, of the generators are run in parallel, which means that all of them run strictly in synchronism; consequently, if a load varies, the water-supply must be varied to each turbine at the same time and in the same manner. This was being accomplished by the apparently primitive device of having a man on the stop-valve of each turbine. The writer does not feel that he is entitled to pass an opinion on this practice; but on mentioning what he had seen to M. R. Thury, of Geneva, who has had immense experience of hydraulic electric stations, that engineer expressed himself as confident that it is quite possible to regulate even such a variable load as that of the Kander automatically. The writer was informed that there was an accident to the water pipes at the Kander station not very long ago which upset the regulating devices. The pressure at which the current is generated was regulated by two men at the switch board, who constantly varied the exciting current of the exciters of the generators, which was itself furnished by an independent dynamo which was the subject of regulation. In a station of this kind the difficulty of regulation is no doubt affected by the fact that any variation in the water supplied to the turbines necessarily alters the pressure under which the water is delivered. The switch board was a fine complicated affair on a base of white marble, and some of the fittings appeared to be from America.

Burgdorf-Thun Railway.—This railway, 40 kilometres long, is not distinguished in any way from an ordinary railway except that it is being worked electrically by power transmitted from the Kander station. The rolling stock consists of ordinary carriages hauled by electric locomotives, each of which carries two asynchronous 300-horse power motors. The motors are connected with the axles through the intermediary of gearing which we were informed can be adjusted to run at either of two speeds, intermediate regulation being obtained by varying the existence of the rotor windings. Immense rheostats are required for motors of this kind, and are carried to a large extent on the top of the locomotive, so that it has a very strange appearance. Two trolley wires are used, the third one being of course the rails, and into this three-wire system current is fed at intervals by fourteen transformer stations. There is nothing of the tramway about this road. It forms part of the permanent railway system of Switzerland, and runs under much the same conditions as if the trains were hauled by steam locomotives.

The average speed is about 18 kilometres per hour with a train of fifty-five tons. Besides the locomotives, automobile carriages equipped up to 240-horse power are provided for the greater part of the passenger traffic, and these trains run at 36 kilometres per hour. Nothing could have been smoother or more satisfactory than the way in which the train (hauled in this case by one locomotive) was stopped and started, and it got up its speed with satisfactory quickness. It may be safely predicted that though this is the first railway of the type (as distinguished from a tramway) it will not be the last, for the transmission of current at 16,000 volts does not demand wires of more than two millimetres diameter for the distances mentioned. No difficulty seems to be experienced in insulation. Ordinary insulators of the double petticoat type without oil are employed, and no special precautions are taken with regard to the posts on which these wires are supported except to inscribe upon them a genial warning as to the fate likely to befall anybody meddling with them.

The railway up the Jungfrau is also a very interesting work, and an excellent day was spent in a visit to it. It goes up to the Rothstock a long way above the Wengern Alp, and there it ends at present in a tunnel. It happened that while some of the party were standing close to the locomotive in the tunnel the line was struck by lightning, the fuses blown in the power station, and the automatic break on the locomotive instantly went into action, though the train was at rest. From the electrical point of view, there was not much to be seen on the Jungfrau Railway, but we had splendid weather, and regarded the trip as a day's holiday.

On the whole we may, perhaps, say that we saw more, but not better, electrical work than can be done in England. We saw that Swiss engineers have the courage of their convictions, and have done more in railway work than most of us had ever dreamed of; and we saw that, as regards the carbide and similar industries, we cannot hope to compete in England till we can get at something cheaper than steam power. On the other hand, English industries in general cannot be regarded as threatened by Swiss enterprise; and Switzerland itself, regarded as a manufacturing country, requires (as Mr. Raworth remarked) to be rolled and to have its lakes filled up.

RICHARD THRELFALL.

THE BRITISH ASSOCIATION.

SECTION K.

BOTANY.

OPENING ADDRESS BY SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., PRESIDENT OF THE SECTION.

A Sketch of the History of Indian Botany.

THE earliest references in literature to Indian plants are, of course, those which occur in the Sanskrit classics. These are, however, for the most part vague and obscure. The interest which these references have, great as it may be, is not scientific, and they may therefore be omitted from consideration on the present occasion. The Portuguese, who were the first Europeans to appear in India as conquerors and settlers, did practically nothing in the way of describing the plants of their Eastern possessions. And the first contribution to the knowledge of the botany of what is now British India was made by the Dutch in the shape of the "Hortus Malabaricus," which was undertaken at the instance of Van Rheede, Governor of the territory of Malabar, which during the latter half of the seventeenth century had become a possession of Holland. This book, which is in twelve folio volumes and is illustrated by 794 plates, was published at Amsterdam between the years 1686 and 1703, under the editorship of the distinguished botanist Commelyn. Van Rheede was himself only a botanical amateur, but he had a great love of plants and most enlightened ideas as to the value of a correct and scientific knowledge of them. The "Hortus Malabaricus" was based on specimens collected by Brahmins, on drawings of many of the species made by Mathæus, a Carmelite missionary at Cochin, and on descriptions originally drawn up in the vernacular language of Malabar, which were afterwards translated into Portuguese by Corneiro, a Portuguese official in Cochin, and from that language finally done into Latin by Van Douet. The whole of these operations were carried on under the general superintendence of Casearius, a missionary at Cochin. Of this most interesting work the plates are the best part; in fact, some of these are so good that there is no difficulty in identifying them with the species which they are intended to represent. The next important contribution to the botanical literature of Tropical Asia deals rather with the plants of Dutch than of British India. It was the work of George Everhard Rumph (a native of Hanover), a physician and merchant, who for some time was Dutch Consul at Amboina. The materials for this book were collected mainly by Rumphius himself, and the Latin descriptions and the drawings (of which there are over one thousand) were his own work. The book was printed in 1690, but it remained unpublished during the author's lifetime. Rumph died at Amboina in 1706, and his manuscript, after lying for thirty years in the hands of the Dutch East India Company, was rescued from oblivion by Prof. John Burman, of Amsterdam (commonly known as the elder Burman), and was published under the title of "Herbarium Amboinense," in seven folio volumes, between the years 1741 and 1755. The illustrations of this work cover over a thousand species, but they are printed on 696 plates. These illustrations are as much inferior to those of Van Rheede's book as the descriptions are superior to those of the latter. The works of Plukenet, published in London between 1696 and 1705, in quarto, contain figures of a number of Indian plants which, although small in size, are generally good portraits, and therefore deserve mention in an enumeration of botanical books connected with British India. An account of the plants of Ceylon, under the name "Thesaurus Zeylanicus," was published in 1737 by John Burman (the elder Burman), and in this work many of the plants which are common to that island and to Peninsular India are described. Burman's book was founded on the collections of Paul Hermann, who spent seven years (from 1670 to 1677) exploring the flora of Ceylon at the expense of the Dutch East India Company. The nomenclature of the five books already mentioned is all uninominal.

Hermann's Cingalese collection fell, however, sixty years after the publication of Burman's account of it, into the hands of Linnæus, and that great systematist published in 1747 an account of such of the species as were adequately represented by specimens, under the title "Flora Zeylanica." This Hermann herbarium, consisting of 600 species, may still be consulted at the British Museum, by the Trustees of which institution it was acquired, along with many of the other treasures possessed by Sir Joseph Banks. Linnæus's "Flora Zeylanica" was followed in 1768 by the "Flora Indica" of Nicholas Burman (the younger Burman)—an inferior production, in which about 1500 species are described. The herbarium on which this "Flora Indica" was founded now forms part of the great Herbarium Delessert at Geneva.

The active study of botany on the binominal system of nomenclature invented by Linnæus was initiated in India itself by Koenig, a pupil of that great reformer and systematist. It will be convenient to divide the subsequent history of botanic science in India into two periods, the first extending from Koenig's arrival in India in 1768, to that of Sir Joseph Hooker's arrival in 1849; and the second from the latter date to the present day.

The pioneer John Gerard Koenig was a native of the Baltic province of Courland. He was a correspondent of Linnæus, whose pupil he had formerly been. Koenig went out to the Danish settlement at Tranquebar (150 miles south of Madras) in 1768, and at once began the study of botany with all the fervour of an enthusiasm which he succeeded in imparting to various correspondents who were then settled near him in Southern India. These friends formed themselves into a society under the name of "The United Brothers," the chief object of their union being the promotion of botanical study. Three of these brothers, viz. Heyne, Klein and Rottler, were missionaries located near Tranquebar. Gradually the circle widened, and before the century closed the enthusiasm for botanic research had spread to the younger Presidency of Bengal, and the number of workers had increased to about twelve, among whom may be mentioned Fleming, Hunter, Anderson, Berry, John, Roxburgh, Buchanan (afterwards Buchanan-Hamilton), and Sir William Jones, so well known as an Oriental scholar. At first it was the custom of this brotherhood merely to exchange specimens, but gradually names began to be given, and specimens, both named and unnamed, began to be sent to botanists of established reputation in Europe. Many plants of Indian origin came thus to be described by Retz, Roth, Schrader, Willdenow, Vahl and